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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DOUGLAS A. HAWKS, SIAMAK FAZELPOUR,
and ROBBIE VILANUEVA

Appeal 2009-004349
Application 10/649,577
Technology Center 2800

Decided: September 24, 2009

Before KENNETH W. HAIRSTON, JOSEPH F. RUGGIERO,
and ELENI MANTIS MERCADER, *Administrative Patent Judges*.

MANTIS MERCADER, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants seek our review under 35 U.S.C. § 134(a) of the Examiner's final rejection of claims 1, 2, 5-8, 16, 17, and 20-28. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

INVENTION

Appellants' claimed invention is directed to a device package formed by attaching removable tape to a surface of a film of conductive material, forming isolated features in the conductive material, attaching encapsulating material to at least a portion of the isolated features and a portion of the tape, and removing the tape from the features and encapsulant (Spec. ¶ [0013]).

Claim 1, reproduced below, is representative of the subject matter on appeal:

1. A method for forming a package for an electronic device, said method comprising the steps of:
attaching a removable material to a surface of a conductive material, wherein said removable material comprises a soluble adhesive;
forming isolated conductive features within said conductive material;
forming a die attach pad within said conductive material;
coupling said electronic device to said die attach pad;
attaching an encapsulant to said isolated conductive features, said die attach pad, said electronic device, and said removable material; and
removing said removable material from said conductive features, said die attach pad, and said encapsulant by dissolving said soluble adhesive, thereby forming said package for said electronic device.

THE REJECTIONS

The Examiner relies upon the following as evidence of unpatentability:

Roche	US 4,530,152	Jul. 23, 1985
Landi	US 4,944,087	Jul. 31, 1990
Juskey	US 5,218,759	Jun. 15, 1993
Weng	US 5,972,234	Oct. 26, 1999 (filed Apr. 6, 1998)
Fjelstad	US 6,001,671	Dec. 14, 1999 (filed Apr. 18, 1996)
Wyland	US 6,111,199	Aug. 29, 2000 (filed Apr. 7, 1998)

The following rejections are before us for review:

1. The Examiner rejected claims 1-2, 5-6, 16, and 20-27 under 35 U.S.C. § 103(a) as unpatentable over Fjelstad in view of Landi and Juskey.
2. The Examiner rejected claims 7-8 and 17 under 35 U.S.C. § 103(a) as unpatentable over Fjelstad in view of Landi and Juskey and further in view of Wyland and Weng.
3. The Examiner rejected claim 28 under 35 U.S.C. § 103(a) as unpatentable over Fjelstad in view of Landi and Juskey and further in view of Roche.

Appellants argue claims 1-2, 5-6, 16, and 20-27 as a group, with claim 1 as representative (App. Br. 6-12).¹ Accordingly, claims 2, 5-6, 16, and 20-27 stand or fall with claim 1. Appellants also argue claims 7-8 and 17 as a group, with claim 7 as representative (App. Br. 12-16). Thus, claims 8 and 17 stand or fall with claim 7. *See* 37 C.F.R. § 41.37 (c)(1)(vii) (2004).

OBVIOUSNESS

ISSUES

Regarding the rejection of claims 1-2, 5-6, 16, and 20-27

Appellants admit that Fjelstad teaches all the limitations of claim 1 (App. Br. 6-7) except that Fjelstad fails to disclose attaching a removable material to a surface of a conductive material, where the removable material comprises a soluble adhesive, and removing the removable material from conductive features, die attach pad, and encapsulant by dissolving the soluble adhesive, as specified in independent claim 1 (App. Br. 7). Appellants state that Fjelstad does not even mention attaching a removable material to a surface of a conductive material, and thus, the sacrificial layer must be removed by actually dissolving it, whereas in the invention as defined by independent claim 1, the removable material is removed by dissolving the soluble adhesive in, for example, hot water (App. Br. 7).

Appellants argue that in Fjelstad, when a wiring layer is needed, removable material 100' must necessarily have a sufficiently strong bond with conductive material 101' to allow portions of removable material 100' to remain attached to an

¹ Only arguments made by Appellants have been considered in this decision. Arguments which Appellants could have made but did not make in the Brief have not been considered and are deemed waived. *See* 37 C.F.R. § 41.37(c)(1)(vii) (2004).

underlying wiring layer after portions of the removable material underlying pads 110' and central conductive region 115' have been removed (App. Br. 8).

Appellants argue that if a soluble adhesive were utilized to attach removable material 100' to conductive material 101' as suggested by Examiner, it would not be possible to dissolve only portions of removable material 100' in a solution without undesirably dissolving (i.e., removing) all of the removable material (App. Br. 8).

Appellants, thus, argue that Landi's or Juskey's removable material would not work for removal of only portions of material 100' in Fjelstad (App. Br. 9-12).

The Examiner responds that Fjelstad teaches that if a wiring layer is not needed the entire sacrificial polymer sheet 100' may be removed by dissolving the sheet (Ans. 8) (col. 5, ll. 60-65). The Examiner finds that the sacrificial polymer sheet layer 100' is attached to the surface of the conductive material 101' (Ans. 8). The Examiner finds that Landi (col. 5, ll. 1-35; col. 6, ll. 14-50; col. 7, ll. 42-46) and Juskey (col. 2, ll. 31-38; col. 3, ll. 24-46) expressly teach dissolving soluble adhesives (Ans. 9-10). Accordingly, the Examiner concludes that the combined references of Fjelstad taken with Landi and Juskey prima facie teach attaching the removable material layer comprising a soluble adhesive to a layer of conductive material; and after encapsulant, removing the removable material by dissolving the soluble adhesive by using a solvent or solution, without damaging the removable material and the molding material (Ans. 10). Landi and Juskey clearly teach removing the sacrificial removable layer by dissolving the soluble adhesive, without damaging the sacrificial removable material layer and without damaging

the molding encapsulant compound, thereby actually dissolving the sacrificial layer is not necessarily carried out or needed to be performed (Ans. 10-11).

Thus, the issue is whether the combination of Fjelstad with Landi and Juskey teach “removing said removable material . . . by dissolving said soluble adhesive” as recited in claim 1.

FINDINGS OF FACT

The following findings of fact (FF) supported by a preponderance of the evidence primarily for emphasis:

1. Appellants admit that Fjelstad teaches all the limitations of claim 1 (App. Br. 6-7) except that Fjelstad fails to disclose attaching a removable material to a surface of a conductive material, where the removable material comprises a soluble adhesive, and removing the removable material from conductive features, die attach pad, and encapsulant by dissolving the soluble adhesive, as specified in independent claim 1 (App. Br. 7).
2. Fjelstad teaches that the sacrificial polymer sheet layer 100' is attached to the surface of the conductive material 101' (Fig. 2A; col. 5, ll. 27-31).
3. The term “adhere” is defined, in pertinent part, as “held in contact[.]” *Webster's 1828 Dictionary*, at <http://1828.mshaffer.com/d/word/adhere> (last visited Sept. 21, 2009).
4. Fjelstad further teaches that if a wiring layer is not needed, the entire sacrificial polymer sheet 100' may be removed by chemically dissolving the sheet (col. 5, ll. 60-65).

5. Landi (col. 5, ll. 1-35; col. 6, ll. 14-50; col. 7, ll. 42-46) and Juskey (col. 2, ll. 31-38; col. 3, ll. 24-46), both in the field of making micro-electronic devices, expressly teach dissolving soluble adhesives, and removing the removable material by dissolving the soluble adhesive by using a solvent or solution, without damaging the removable material and the molding material.
6. Wyland teaches a water soluble adhesive (col. 7, ll. 48-67).
7. Weng teaches a water soluble adhesive for removing a removable adhesive with deionized water (col. 5, ll. 34-37).
8. Roche teaches that each component can be separated from others after encapsulation “either before or after removal of the temporary substrate” (col. 4, ll. 20-25).

PRINCIPLES OF LAW

The Examiner bears the initial burden of presenting a *prima facie* case of obviousness. *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992). If that burden is met, then the burden shifts to the Appellant to overcome the *prima facie* case with argument and/or evidence. (*See id.*)

The Examiner’s articulated reasoning in the rejection must possess a rational underpinning to support the legal conclusion of obviousness. *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). The Supreme Court, citing *In re Kahn*, 441 F.3d at 988, stated that “rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR*

Int'l Co. v. Teleflex Inc., 550 U.S. 398, 418 (2007). However, “the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *Id.*

“[O]ne cannot show non-obviousness by attacking references individually where . . . the rejections are based on combinations of references.” *In re Keller*, 642 F.2d 413, 426 (CCPA 1981).

“The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference Rather, the test is what the combined teachings of those references would have suggested to those of ordinary skill in the art.” *Id.* at 425.

ANALYSIS

Regarding the rejection of claims 1-2, 5-6, 16, and 20-27

Appellants admit that Fjelstad teaches all the limitations of claim 1 (App. Br. 6-7) except that Fjelstad fails to disclose attaching a removable material to a surface of a conductive material, where the removable material comprises a soluble adhesive, and removing the removable material from conductive features, die attach pad, and encapsulant by dissolving the soluble adhesive, as specified in independent claim 1 (App. Br. 7) (FF 1).

Fjelstad teaches that the sacrificial polymer sheet layer 100' is attached to the surface of the conductive material 101' (FF 2). The term “adhere” is defined, in pertinent part, as “held in contact” (FF 3). Thus, the sacrificial polymer sheet layer 100' is held in contact (i.e., adhered to) with the conductive material with

some type of material. Fjelstad further teaches that if a wiring layer is not needed, the entire sacrificial polymer sheet 100' may be removed by chemically dissolving the sheet (FF 4). Since the sacrificial polymer sheet can be dissolved, then necessarily what held the sacrificial polymer sheet 100' (i.e., adhesive) attached to the conductive material 101' must also be dissolved. Accordingly, Fjelstad teaches "removing said removable material" (i.e., dissolving the sacrificial polymer sheet layer 100') "by dissolving said soluble adhesive" (i.e., when dissolving the sacrificial polymer sheet layer 100' necessarily the material attaching it to the conductive layer will also be dissolved). We note that nothing in the claim language precludes destruction of the removable material.

Nonetheless, the Examiner finds (Ans. 9-10), and we agree, that Landi and Juskey, both in the field of making micro-electronic devices, expressly teach dissolving soluble adhesives, and removing the removable material by dissolving the soluble adhesive by using a solvent or solution, without damaging the removable material and the molding material (FF 5).

The Examiner's articulated reasoning for combining the references is that using the soluble adhesive as taught by Landi and Juskey to attach the sacrificial polymer sheet layer 100' to the conductive layer 101' would "simplify and easily facilitate the removal of the removable material comprising the soluble adhesive from the encapsulated device by simply dissolving the adhesive in the solvent" (Ans. 5). Accordingly the articulated reasoning in the rejection does possess a rational underpinning to support the legal conclusion of obviousness. *See Kahn*, 441 F.3d at 988.

Accordingly, we are not persuaded by Appellants' arguments (App. Br. 7) that Fjelstad does not even mention attaching a removable material to a surface of a conductive material, and thus, the sacrificial layer must be removed by actually dissolving it, whereas in the invention as defined by independent claim 1, the removable material is removed by dissolving the soluble adhesive in, for example, hot water. We are not persuaded by these arguments because the claim language does not preclude removing the removable material by dissolving it and the Examiner relied on Landi and Juskey for the teachings of dissolving the removable adhesive, not on Fjelstad. One cannot show non-obviousness by attacking references individually (i.e., Fjelstad not expressly teaching the soluble adhesive) where the rejections are based on combinations of references (i.e., the Examiner relied on Landi and Juskey for the teaching of soluble adhesive). *See Keller*, 642 F.2d at 426.

We are also not persuaded by Appellants' argument (App. Br. 8) that in Fjelstad, when a wiring layer is needed, removable material 100' must necessarily have a sufficiently strong bond with conductive material 101' to allow portions of removable material 100' to remain attached to an underlying wiring layer because this is not the embodiment upon which the rejection was based. The Examiner relied on the embodiment wherein the "*entire*" removable material 100' is removed (FF 4) (emphasis added), and thus, a strong bond between layers 100' and 101' is not required. Similarly, we are not persuaded by Appellants' argument (App. Br. 9-12) that Landi's or Juskey's removable material would not work for removal of only portions of material 100' in Fjelstad, because the Examiner relies on the entire removal of the removable material 100'.

For the foregoing reasons, we sustain the rejection of claim 1 and claims 2, 5-6, 16, and 20-27, which fall with claim 1.

Regarding the rejection of claims 7-8 and 17

Appellants again premise their argument on Fjelstad's embodiment when a wiring layer is utilized, and thus, Wyland's water soluble adhesive (FF 6) and Weng's water soluble adhesive for removing a removable adhesive with deionized water (FF 7) would thereby cause unintentional separation from the wiring layer (App. Br. 13-15).

For the same reasons as articulated *supra*, we are not persuaded by Appellants' argument as the Examiner relied on Fjelstad's embodiment of *entire* removal of the removable material 100' (Ans. 14-16).

For the foregoing reasons, we also sustain the Examiner's rejection of claims 7-8 and 17.

Regarding the rejection of claim 28

Appellants repeat the same arguments as above (App. Br. 18), and thus, for the same reasons as articulated *supra* we remain unpersuaded. Appellants further argue that Fjelstad discloses dicing the packages into either individual packages or multichip packages after portions of polymer sheet 100' are removed (App. Br. 16). The Examiner relied on Roche for teaching that each component can be separated from others after encapsulation "either before or after removal of the temporary substrate" (FF 8).

We agree with the Examiner that one cannot show non-obviousness by attacking references individually where the rejections are based on combinations of references. *See Keller*, 642 F.2d at 426.

For the foregoing reasons, we also sustain the Examiner's rejection of claim 28.

CONCLUSIONS

Under 35 U.S.C. § 103, Appellant has not shown that the Examiner erred in finding that the combination of Fjelstad with Landi and Juskey teach "removing said removable material . . . by dissolving said soluble adhesive."

Appellants have also not shown that the Examiner erred in combining Fjelstad with Landi and Juskey with the additional references of Wyland, Weng, and Roche.

ORDER

The decision of the Examiner to reject claims 1, 2, 5-8, 16, 17, and 20-28 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

Appeal 2009-004349
Application 10/649,577

AFFIRMED

ELD

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